INFORMATION REPORT INFORMATION REPORT

CENTRAL INTELLIGENCE AGENCY

-	·	S-E-C-R	<u> </u>		50X1-HUM
DUNTRY	USSR		REPORT		
BJECT	Iron and Steel Resea Development in the U		DATE DISTR.	5 Februa	ry 1959
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			REFERENCES	RD	
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2.	Attachment 1 contains development in the US development.		on on the following ocess steel, mech	ing aspects	of steel
2.	development in the US	SSR: vacuum pronte the field of station on the fo	ocess steel, mech	anical test scussed in s: blast fu	attachment

X FBI

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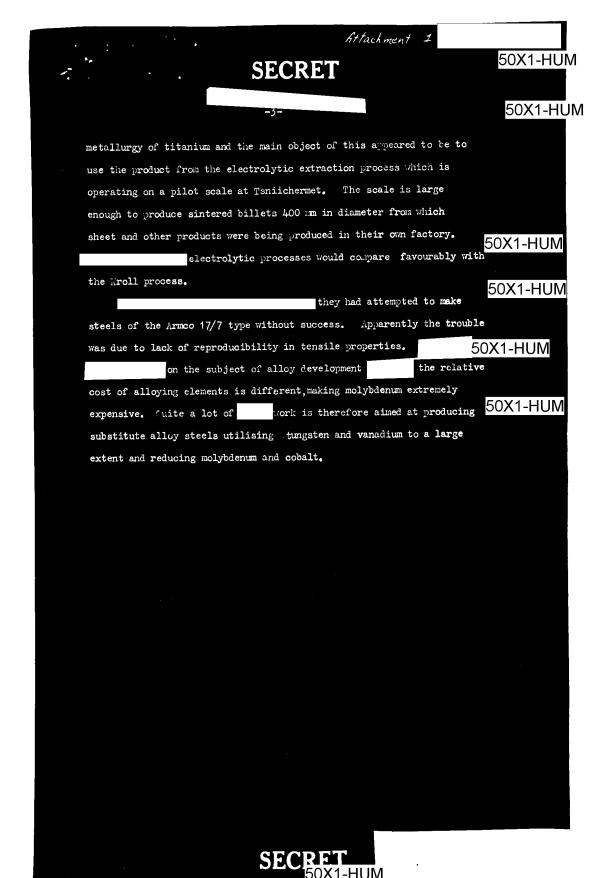
X ARMY

X NAVY

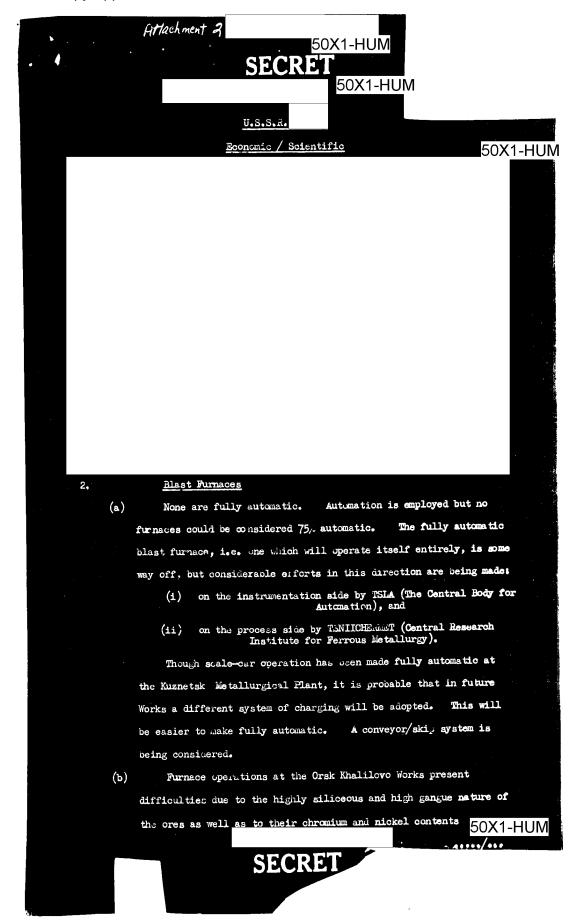
(Note: Weishington distribution indicated by "X"; Field distribution by "#".)

50X1-HUM
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DIEGIA
RUSSIA 50X1-HUM
Iron and Steel Research Development (Tetallurgy) 50X1-HUM
1. Vacuum Procesa Steel.
There appear to be major developments in both vacuum melting and vacuum
casting in ussia. Probably the greatest development is in vacuum casting where
10 installations with capacities up to 50 tons each are in
operation in Russia for the production of silicon transformer steels and aircraft
grade steels. These all appear to be simple ladle de-gassing processes and 50X1-HUM
apparently they are convinced of the merit of such treatments.
the total steel weight vacuum-treated annually is 200,000 tons. It is well
known that Samarin has been active in this field and consequently there has been
a large amount of research work carried out in the Baikov Institute, and probably
the largest tonnage of steel made is of silicon transformed steel. Both at the
Balkov Institute and at Taniichermet there are arc vacuum melting units of 22" dia.
where the major interest has been in the production of ball bearing steels. Both
of these Institutes claim to have demonstrated the superiority of vacuum-melte 50X1-HUM
steel for this application, but commercial production could not
yet be justified commercially. The steels used are 1, C $1\frac{1}{2}$, Cr, with an addition
of $rac{1}{2}$. Si, $rac{1}{2}$. In for large bearing sizes. It Tsniichermet they have arrangements
where steels are made and processed for sale and certainly some of this steel has
been made into bearings. No results were available,
2. echanical Testing.
Research relating to high temperature tests in tensile machines and to
creep tests is probably being conducted at the Hoscow Aviation Institute. The 50X1-HU
interests of Tsniichermet on the other hand are predominantly nowen plant steels.
reinforcing steels and recision steels we see the later particular magnetic
properties.

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	50	X1-HUM
	In contrast, the interests at the Baikov Institute are mainly connected	
	with Nickel, titanium and niobium base alloys. Here there appears	
	to be a large amount of work on binary and ternary alloy systems and	
	a lot of the creep testing work was of a sorting nature using the	
	centrifugal test machine designed by professor pornilov. Apart from	A L
	these creep machines all the other creep machines were of the standard	0X1-HUM
	high sensitivity type	
	there are only 800 to 1000 creep	
	machines in Russia. There were approximately 150 creep machines both	
	at Tsniichermet and the Baikov Institute. The Lajority of these were	j.
	for operating temperatures up to 850 to 900°C but there were	
	three special machines for use at 1200°C. more of	0X1-HUM
	these high temperature machines were under construction.	
	There appeared to be quite a large amount of fatigue testing using	
	large pulsating machines which were of $100(\frac{1}{2}15)$, $200(\frac{1}{2}50)$ and $600(\frac{1}{2}75)$	
	tons capacity. On these machines high temperature furnaces could be	
	installed for high temperature operation. There was one machine of	
	30 tons capacity where the complete machine was enclosed in a furnace.	
	It is of interest that all these machines were manufactured by Schopper	
	of Leipzig.	
	3. Alloy Development	
	As mentioned above there is a lot of work being done on nickel	
	base precipitation hardening alloys and this work extends to detailed	2264 11111111111111111111111111111111111
		DX1-HUM
	developed electron microscope techniques	
	Similar stages were also being made of tempering processes in alloy	
	steels, Irofessor Hornilov	50X1-HUM
	was using a combination of techniques such as hot hardness and	
	centrifugal fatigue testing to obtain preliminary information on a very	
	extensive range of alloys.	. 4
	There appeared to be considerable interest in the powder	To the second se
	SECRET /metallurgy	***
		50X1-HUM



50X1-HUM



Attachment 2 50X1-HUM 50X1-HUM There is not enough experience on the use of oxygenate (c) blast for sweel-making production to be able to say whether a 25, oxygen content led to a 25, production increase. The tests at Nova Tula, where some tests were made, are not really applicable to modern practice because of the small size of the furnace and the At this Works, however, poor quality of the raw materials. ferro-manyanese production has doubled by the use of a 32,0 oxygen content. This large increase is, however, undoubtedly due to the beneficial action of oxygenation on cuke rate. There is no reason to expect such figures for steel-making pig iron production. In tests on the large furnace at the Mizhne-Tagil Commine, $2h_{V^{\perp}}$ was the highest oxygenation achieved and this gave a productivity increase of the order of 8/2 for steel making iron. 50X1-HUM production for ferro In general, manganese might se increased by 25% with a 25% oxygen content but this figure was too high for ordinary pig iron. 50X1-HUM A 1719 m3 blast furnace is in operation at Krivoi Rog. (a) a utilisation figure equal to C.7 could be considered as reasonable for "Southern practice"; thus a 1719 m blast furn ce should give a daily production of 24,50 tons. however, that better figures would very likely e50X1-HUM be obtained. For instance, at Chelyavinsk, another furnace of equal caracity will shortly be blown in and production from this furnace is estimated at 2650 tons per day. 50X1-HUM Top blowing processes at TSLA are described in "STAL" 1957 (e) No. 8, pages 693 - 700. These top blowing processes have been adopted at the Petrovskii and Krivoi Rog Works. the convertor shop at the Orak Khalilovo (f) 50X1-HUM Plant used Bessemer converters. SECRET 50X1-HUM

•		Attachment 2
		SECRET 50X1-HUM
		50X1-HUM
	3.	Continuous Casting
	(a)	A new large plant is building at Stalino in the Donbas.
	(d)	a new project for a 250 ton continuous
		casting plant will have an 8-strand machine
	(c)	OUXTHON
		because of the rapid expansion of the Soviet steel industry.
		economies in a rapidly expanding industry could
		be effected by the saving of primary mill construction due to the 50X1-HUM
		in troduction of continuous casting.
		continuous casting was far more flexible than conventional methods.
٠		given the present rate of research and dovelopment enough experience
		will have seen accumulated by 1962 for a decision to be made as to
		whether primary rolling could safely be abandoned in favour of
		continuous casting techniques.
	4.	Min Coating 50X1-HUM
		tin was relatively plentiful
		in the U.S.S.A. also it was expensive: hence
		the need to economise in its use. From
		ambiguities between relative plenty and 50X1-HUM
		expense, economies in the use of
		tin might be caused by the desire of the State to have large
		quantities available for export.
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		SECRET 50X1-HUM
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